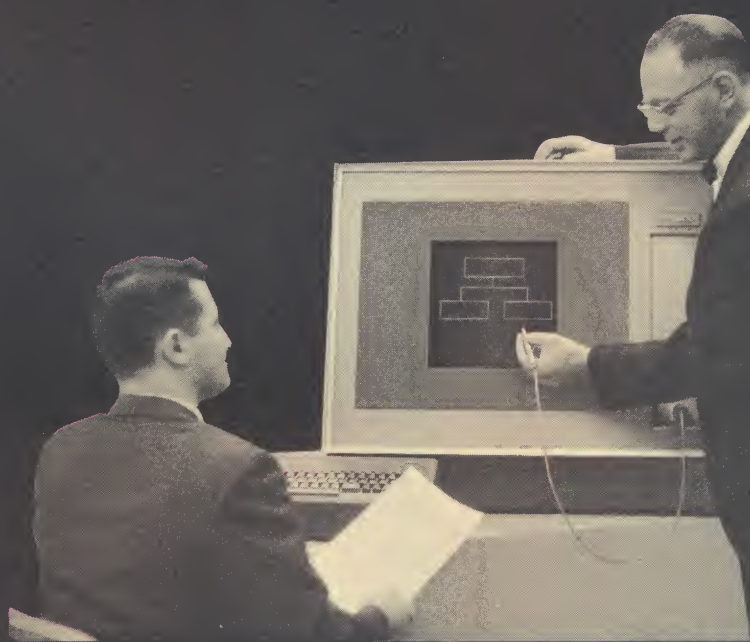


A COMPATIBLE VERSATILE DISPLAY FOR INSTANT ACCESS TO COMPUTER STORED INFORMATION

PHILCO[®] READ

Real-time Electronic
Access and Display



Communications and Electronics Division, Willow Grove, Pa.

PHILCO[®]
A SUBSIDIARY OF Ford Motor Company.

WHAT IT IS . . .

The modern digital computer is truly a remarkable device. However, with its growing capacity for storage of information (billions of characters) and its lightning fast internal speeds (measured in nanoseconds), the computer is already far ahead of man's ability to utilize its information retrieval capabilities.

Paper tapes, punch cards and high speed printers are continuously being improved but remain woefully slow compared with the internal access speeds of the computer. They are significantly slow when equated with the Real-Time requirements of the user.

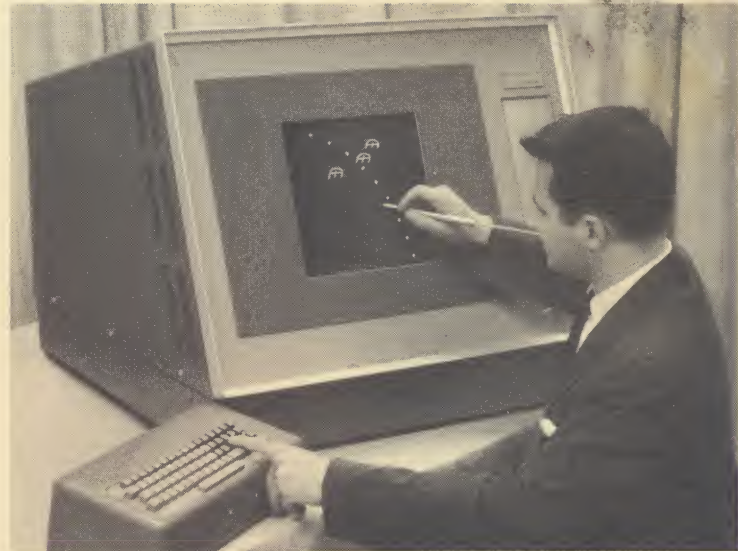
Philco's READ (Real-time Electronic Access and Display system) provides a giant step in information retrieval techniques by offering instant visual communication with stored computer information. READ is essentially an electronic display system which converts digital data to a visual display on a cathode ray tube. The displayed data can be generated in textual, tabular and annotated graphical formats. Retrieved information can be viewed directly on the face of the cathode ray tube, optically displayed on a wall screen, recorded onto 16mm or 35mm film or transposed through a Xerox recorder into hard copy.

READ's format versatility, display variations and ultra-fast speed, make it particularly well suited for use in automated teaching, computer-aided design, command and control systems, computer program checkout, satellite tracking and other applications where dynamic and plotting capabilities are required.

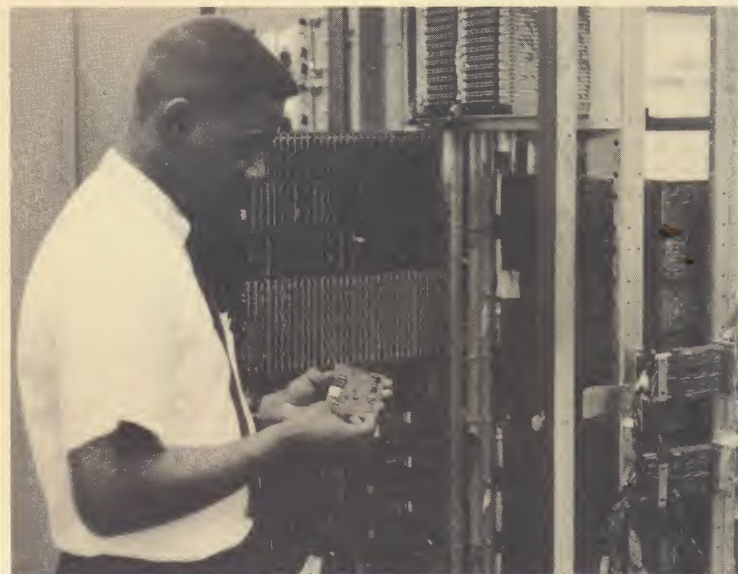
WHAT IT DOES . . .

The READ system is composed of a format controller, a character generator, a vector generator, a control logic module, a typewriter keyboard input device, a cursor, a cathode ray tube-optical display module and a custom engineered interface for mating with your computer system.

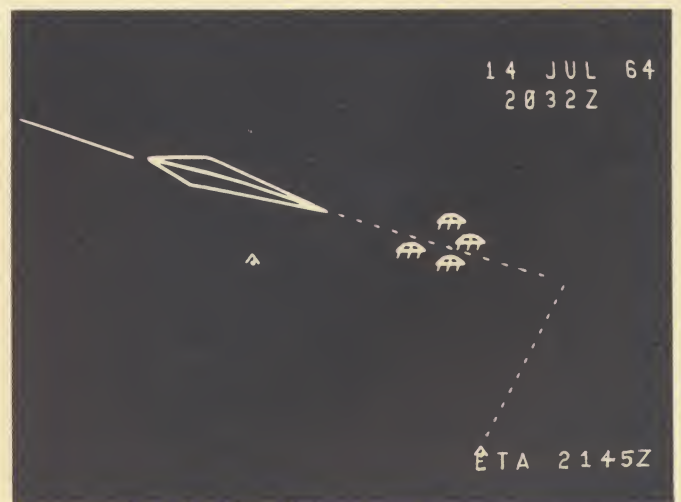
The READ system will accept data from the typewriter keyboard, or directly from the data processor. READ will accept data at rates up to 950,000 characters per second. Pre-programmed command codes which establish the format to be displayed are interpreted by the systems control logic and routed to the format controller, character generator or vector generator. Map overlays, X-Y plots, dynamic tracking, block diagrams and alpha-numeric information are instantly displayed to the user. Dynamic information such as the position of an orbiting satellite can be projected onto a wall screen map as an overlay so that its exact position can be visually monitored in real-time. In addition to direct viewing, hard copy records of static plots, block diagrams, and textual and tabular information can be made on film or Xerox.



Light Pen being used for display correction



Transistorized printed circuit cards are used throughout the system



Air traffic control display on CRT

READ is fast

READ can display over 4000 characters and 2000 lines at a repetition rate of thirty cycles per second, without flicker. Film records can be made with printing speeds of 36,000 lines per minute and graphic records at a rate of six graphs per second. This total capability is unobtainable today on electro-mechanical equipment.

READ is versatile

The combination of the cathode ray display and optical and film attachments coupled with its ability to present data in textual, tabular and graphic forms make READ the most versatile information retrieval device available.

READ is compatible

Any digital computer system can utilize READ when connected through a custom designed, relatively simple interface. READ can be connected on-line to a central processor or can be provided with its own internal storage unit which requires minimal interface.

READ is programmable

Software for the optimum utilization of READ has already been investigated and basic routines have been devised. User software packages will be available shortly.

READ is reliable

Reliability has been engineered into the READ system with extended testing indicating a Mean Time Between Failure of 200 hours. Experience with the system indicates a Mean Time To Repair of 30 minutes.

READ is available

READ has already been built and is in operation. A complete system including 12 remote consoles and the necessary interface can be delivered within five months.

ENGINEERED COMPATIBILITY . . .

With the exception of the monitor, the READ system is completely transistorized, resulting in a compact and easily maintained installation. Modularization of READ subsystems permits simplified variation in console configuration. Thus READ can be customized to your system installation with a minimum of disruption.

Remote consoles greatly enhance and extend the scope of the READ system and can be used for inter-network communications. READ utilizes the central computer processor as the automatic data source but is independent of the processor once the information has been transferred. READ can be operated manually for data insertion and can also be utilized when the central processor is not available.

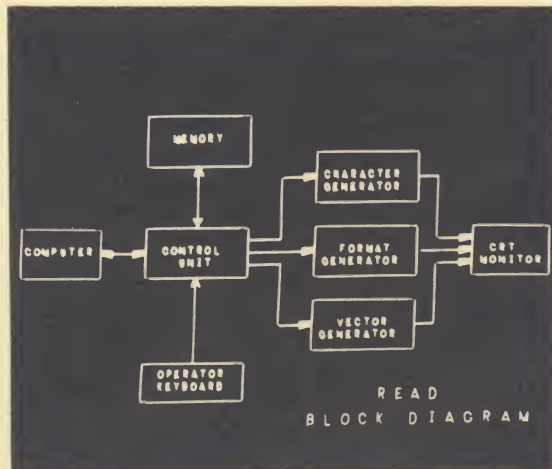
This advanced design peripheral computer equipment will give your information storage and retrieval system a **true** real-time capability with the many added advantages of unique display and hard copy presentation.



Tracking display projected on map overlay

THIS IS THE PHILCO REAL TIME ELECTRONIC ACCESS DEVICE. READ IS A COMPUTER DRIVEN DISPLAY WHICH CAN GENERATE A TABULAR, TEXTUAL OR ANNOTATED GRAPHICAL DISPLAY ON ANY SIZE CRT. YOU ARE VIEWING THE READ PROJECTION CRT SYSTEM. THIS VERSION OF READ PROVIDES ADEQUATE LIGHT OUTPUT FOR EASY VIEWING OF A 6X6 FOOT DISPLAY IN A FIVE FT AMBIENT. DIRECT VIEW CRT TO 24 INCHES IN SIZE AS WELL AS HIGH RESOLUTION CRT FOR PHOTO RECORDING CAN ALSO BE PROVIDED.

Textual message generated on CRT



Block diagram generated on CRT

The Philco Real-time Electronic Access Display system (READ) is composed of modular units providing adaptability to various system configurations. A basic system consists of a Common Display Logic (CDL) unit with a

maximum of fifteen (15) remote units. The design of the CDL provides various options for on-line/off-line operation with various degrees of capability. The following are general specifications for a typical system:

- a. Power Requirements
CDL 115V 1 phase 2000 watts
Remote Units 115V 1 phase 500 watts
- b. Physical Characteristics
CDL 24"x60"x72" 700 lb.
Console 31"x26"x36" 150 lb.
Console Power Supply 24"x24"x28" 175 lb.
CDL can be located a maximum of 75 ft. from the digital data source. The console and the console power supply which are collocated can be located a maximum of 75 ft. from the CDL.
- c. Nominal Internal Storage
A core memory with 4096 (36 bit) word capacity.
- d. Symbol/Character Generator
Wired integrated line stroke method with a maximum of twenty-four (24) line segments. Maximum of seven character sizes—8:1 ratio.
- e. CRT Size
Console: 16" round, 19" round, 24" rectangular.
Direct Projection: 10" or 12" high intensity, optically flat faced tube with simple refractive optic lens.
- f. Refresh Rate
30 frames per second Nominal.
- g. Vector Generator
Vector length up to $\frac{1}{8}$ screen diameter. Vector specified to interconnect point of 1024 x 1024 X-Y grid. Vector initial and terminal point accuracy of 1/512 screen diameter. Solid and dashed vectors.
- h. Type of Circuit
Transistorized printed circuit cards.
- i. Absolute Position Accuracy
 $\pm 2.0\%$
- j. Character Transfer Rate
Max. 950,000 characters per second asynchronous.
200,000 characters per second synchronous.
- k. Major Position Change (Major Screen Diameter)
12.5 μ sec on 16" CRT
- l. Average Character Drawing Time
3.0 μ sec.
- m. Average Vector Drawing Time
10 μ sec.
- n. Succession Character Position Time
2 μ sec with 16 characters per line.
- o. Options
 - 1. High intensity direct projection
 - 2. Hard copy printer (multiple)
 - 3. Microfilm
 - 4. Light pen/cursor control
 - 5. Off-line operation
 - 6. Format control/stunt box
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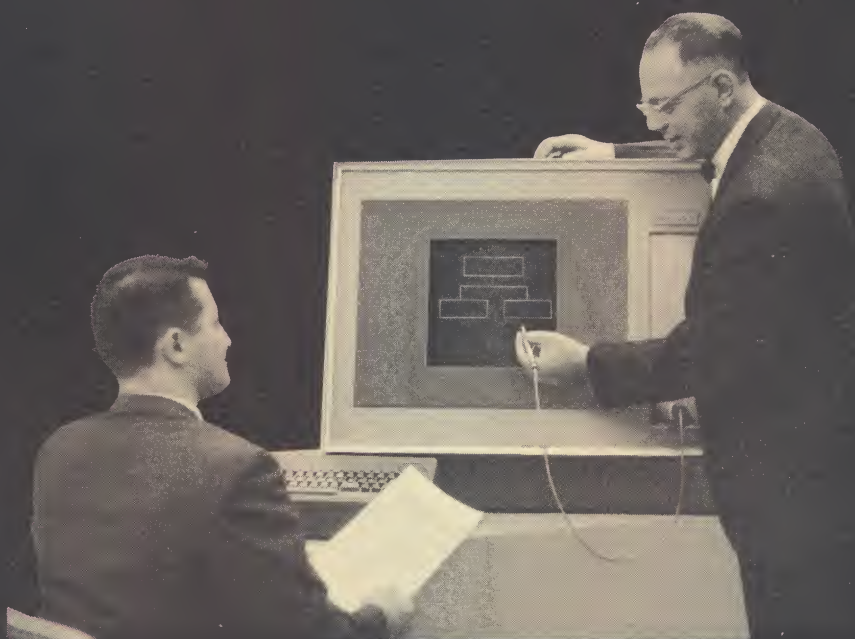
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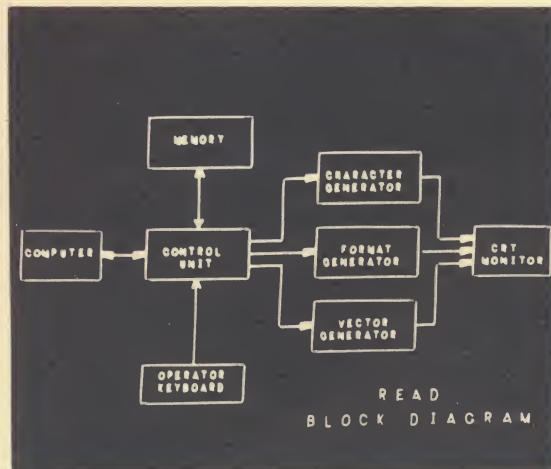
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- d. Symbol/Character Generator
 - Wired integrated line stroke method with a maximum of twenty-four (24) line segments. Maximum of seven character sizes—8:1 ratio.
- e. CRT Size
 - 64K characters when $K=1$ to 8.
 - 64 key keyboard.
 - Console: 16" round, 19" round, 24" rectangular.
 - Direct Projection: 10" or 12" high intensity, optically flat faced tube with simple refractive optic lens.
- f. Refresh Rate
 - 30 frames per second Nominal.
- g. Vector Generator
 - Vector length up to $\frac{1}{8}$ screen diameter. Vector specified to interconnect point of 1024 x 1024 X-Y grid. Vector initial and terminal point accuracy of 1/512 screen diameter. Solid and dashed vectors.
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 - $\pm 2.0\%$
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